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~~Claims~~

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1. A method for controlling a data unit oriented communication between a sender and a receiver operating in accordance with a predetermined communication protocol, where

said sender divides an amount of data to be sent into one or more data units having a structure determined by said protocol,

said receiver acknowledges the correct receipt of data units by returning acknowledgment data units to said sender,

said data units are sent by said sender in accordance with a flow control procedure conducted on the basis of one or more adaptive parameters and said acknowledgment data units, and

said flow control procedure comprises a data loss detection mechanism capable of detecting data loss in said communication, said data loss detection mechanism being triggered to indicate the potential loss of data by one or more predetermined events, where in response to the triggering of said data loss detection mechanism a corresponding response procedure is conducted, said response procedure comprising at least two different modes for adapting said one or more adaptive parameters.

2. A method according to claim 1, wherein said data loss

detection mechanism is a time out mechanism, such that after a data unit is sent, said sender monitors a time out period and if no acknowledgment data unit

associated with said data unit is received before said time out period expires, said time out mechanism is triggered.

3. A method according to claim 1, wherein said data loss detection mechanism is a duplicate acknowledgment detection mechanism, such that said sender monitors the received acknowledgments, and if a data unit is acknowledged a predetermined number of times, said duplicate acknowledgment detection mechanism is triggered.

4. A method according to claim 2 or 3, wherein said response procedure comprises the retransmission of a given data unit.

5. A method according to claim 4, wherein the decision on which of said at least two modes to choose for adapting said adaptive parameters is made on the basis of one or more acknowledgment data units received by said sender after having retransmitted said given data unit.

6. A method according to claim 2, wherein said time out period is one of said adaptive parameters.

7. A method according to one of claims 1 to 6, wherein said flow control procedure is window based, and one or more flow control windows are among said adaptive parameters.

8. A method according to claim 5, wherein said at

least two modes consist of a first and a second mode, said first mode being associated with the judgment that the triggering event was caused by the loss of said given data unit, and said second mode being associated with the judgment that said given data unit or the acknowledgment data unit for said given data unit has been excessively delayed.

9. A method according to claim 8, wherein said sender marks

data units being sent such that an original transmission may be distinguished from a retransmission, and said receiver correspondingly marks the acknowledgment data units, such that the acknowledgment of an originally sent data unit may be distinguished from the acknowledgment of the retransmission of said data unit.

10. A method according to claim 9, wherein the sender marks

data units by including a time stamp in each sent data unit, said time stamp indicating the time said data unit was sent, and the receiver marks the acknowledgment data unit for a received data unit by including the time stamp contained in said received data unit in the acknowledgment data unit for said received data unit.

11. A method according to claim 9, wherein the sender marks

data units by including a bit string in each sent data unit, said bit string having at least two different values for distinguishing between an original transmission and a retransmission, and the receiver marks the acknowledgment data unit for a received data unit by including the bit string

contained in said received data unit in the acknowledgment data unit for said received data unit.

12. A method according to claim 11, wherein said bit string consists of a single bit.

13. A method according to claim 11, wherein said bit string consists of a plurality of bits, such that said bit string is capable of distinguishing between different retransmissions.

14. A method according to one of claims 10 to 13, wherein said first mode is chosen if the first acknowledgment data unit associated with said given data unit that is received after having retransmitted said given data unit acknowledges the retransmission of said given data unit, and said second mode is chosen if the first acknowledgment data unit associated with said given data unit that is received after having retransmitted said given data unit acknowledges the original transmission of said given data unit.

15. A method according to claim 8, wherein

the sender measures the round trip time associated with the connection for sending of said amount of data,

the time between the retransmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit is determined and compared to a value

derived from one or more of said round trip time measurements, and

said first or second mode is chosen on the basis of the result of said comparison.

16. A method according to claim 15, wherein said value derived from said round trip time measurements is the shortest round trip time for the connection, and the second mode is chosen if said time between the retransmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit is smaller than a predetermined fraction of said smallest round trip time.

17. A method according to one of claims 8 to 16, wherein the second mode comprises adapting the time out period on the basis of the time that elapsed between the original transmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit.

18. A method according to one of claims 8 to 17, wherein the flow control procedure is window based and a congestion window is used, where the value of said congestion window at the time of said triggering event is stored after said triggereing event occurred and subsequently said value of the congestion window is reset to a predetermined value, and if said second mode is chosen after having received the first acknowledgment data unit associated with said given data unit, said value of

said congestion window is set to the value it would have assumed, had the response procedure not taken place.

19. A communication device for data unit oriented communication in accordance with a predetermined communication protocol, where said communication protocol prescribes that the sender in a communication divides an amount of data to be sent into one or more data units having a structure determined by said protocol and the receiver in said communication acknowledges the correct receipt of data units by returning acknowledgment data units to the sender,

where said communication device, when acting as a sender, is arranged to send data units in accordance with a flow control procedure that is conducted on the basis of one or more adaptive parameters and said acknowledgment data units,
said flow control procedure comprising a data loss detection mechanism capable of detecting data loss in said communication, said data loss detection mechanism being triggered to indicate the potential loss of data by one or more predetermined events, where in response to the triggering of said data loss detection mechanism a corresponding response procedure is conducted, said response procedure comprising at least two different modes for adapting said one or more adaptive parameters.

20. A device according to claim 19, wherein said data loss

detection mechanism is a time out mechanism, such that after a data unit is sent, said device when acting as a sender monitors a time out period and if

no acknowledgment data unit associated with said data unit is received before said time out period expires, said time out mechanism is triggered.

21. A device according to claim 19, wherein said data loss detection mechanism is a duplicate acknowledgment detection mechanism, such that said device when acting as a sender monitors the received acknowledgments, and if a data unit is acknowledged a predetermined number of times, said duplicate acknowledgment detection mechanism is triggered.

22. A device according to one of claims 19 to 21, wherein said response procedure comprises the retransmission of a given data unit.

23. A device according to claim 22, wherein the decision on which of said at least two modes to choose for adapting said adaptive parameters is made on the basis of one or more acknowledgment data units received by said sender after having retransmitted said given data unit.

24. A device according to claim 20, wherein said time out period is one of said adaptive parameters.

25. A device according to one of claims 19 to 24, wherein said flow control procedure is window based, and one or more flow control windows are among said adaptive parameters.

26. A device according to claim 23, wherein said at least two modes consist of a first and a second mode, said first mode being associated with the judgment that the triggering event was caused by the loss of said given data unit, and said second mode being associated with the judgment that said given data unit or the acknowledgment data unit for said given data unit has been excessively delayed.

27. A device according to claim 26, wherein said device when

acting as a sender marks data units being sent such that an original transmission may be distinguished from a retransmission, and said device when acting as a receiver correspondingly marks the acknowledgment data units, such that the acknowledgment of an originally sent data unit may be distinguished from the acknowledgment of the retransmission of said data unit.

28. A device according to claim 27, wherein the device when

acting as a sender marks data units by including a time stamp in each sent data unit, said time stamp indicating the time said data unit was sent, and the device when acting as a receiver marks the acknowledgment data unit for a received data unit by including the time stamp contained in said received data unit in the acknowledgment data unit for said received data unit.

29. A device according to claim 27, wherein the device when

acting as a sender marks data units by including a bit string in each sent data unit, said bit string having at least two different values for

distinguishing between an original transmission and a retransmission, and the device when acting as a receiver marks the acknowledgment data unit for a received data unit by including the bit string contained in said received data unit in the acknowledgment data unit for said received data unit.

30. A device according to claim 28 or 29, wherein said first mode is chosen if the first acknowledgment data unit associated with said given data unit that is received after having retransmitted said given data unit acknowledges the retransmission of said given data unit, and said second mode is chosen if the first acknowledgment data unit associated with said given data unit that is received after having retransmitted said given data unit acknowledges the original transmission of said given data unit.

31. A device according to claim 26, wherein

the device when acting as a sender measures the round trip time associated with the connection for sending of said amount of data,

the time between the retransmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit is determined and compared to a value derived from one or more of said round trip time measurements, and

said first or second mode is chosen on the basis of the result of said comparison.

32. A device according to claim 31, wherein said value derived from said round trip time measurements is the shortest round trip time for the connection, and the second mode is chosen if said time between the retransmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit is smaller than a predetermined fraction of said smallest round trip time.

33. A device according to one of claims 26 to 32, wherein the second mode comprises adapting the time out period on the basis of the time that elapsed between the original transmission of said given data unit and the receipt of the first acknowledgment data unit associated with said given data unit.

34. A device according to one of claims 26 to 33, wherein the flow control procedure is window based and a congestion window is used, where the value of said congestion window at the time of said triggering event is stored after said triggering event occurred and subsequently said value of the congestion window is reset to a predetermined value, and if said second mode is chosen after having received the first acknowledgment data unit associated with said given data unit, said value of said congestion window is set to the value it would have assumed, had the response procedure not taken place.

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